A European perspective of ecosystem services and related EU policies

Luca Montanarella
European Commission
Ecosystem services and ecosystem change

Natural capital underpins ecosystem service production and is an essential input into our economies and livelihoods

Our life insurance, our natural capital: an EU biodiversity strategy to 2020 (COM(2011) 244)

2050 vision

By 2050, European Union biodiversity and the ecosystem services it provides are protected, valued and appropriately restored for biodiversity’s intrinsic value and for their essential contribution to human well-being and economic prosperity, and so that catastrophic changes caused by the loss of biodiversity are avoided.

2020 headline target

Halting the loss of biodiversity and the degradation of ecosystem services in the EU by 2020, and restoring them in so far as feasible, while stepping up the EU contribution to averting global biodiversity loss.

Source: Millennium Ecosystem Assessment
ECOSYSTEM SERVICES
FROM POLICY TO PRACTICE

• TARGET 1: FULLY IMPLEMENT THE BIRDS AND HABITATS DIRECTIVES
• TARGET 2: MAINTAIN AND RESTORE ECOSYSTEMS AND THEIR SERVICES
• Target 3: INCREASE THE CONTRIBUTION OF AGRICULTURE AND FORESTRY TO MAINTAINING AND ENHANCING BIODIVERSITY
• TARGET 4: ENSURE THE SUSTAINABLE USE OF FISHERIES RESOURCES
• TARGET 5: COMBAT INVASIVE ALIEN SPECIES
• TARGET 6: HELP AVERT GLOBAL BIODIVERSITY LOSS
Target 1 of EU Biodiversity Strategy
Nature conservation

To halt the deterioration in the status of all species and habitats covered by EU nature legislation and achieve a significant and measurable improvement in their status so that, by 2020, compared to current assessments:

(i) 100% more habitat assessments and 50% more species assessments under the Habitats Directive show an improved conservation status;
(ii) 50% more species assessments under the Birds Directive show a secure or improved status.

Actions:
- Complete the establishment of the Natura 2000 network and ensure good management
- Ensure adequate financing of Natura 2000 sites
- Increase stakeholder awareness and involvement and improve enforcement
- Improve and streamline monitoring and reporting

http://biodiversity.europa.eu
The cornerstone of the EU’s biodiversity policy

The largest co-ordinated network of conservation areas in the world

c.26,000 sites
~ 18 % of EU 27 territory
+ significant marine areas
Human Impact in Europe
Extreme intensification of agriculture

High Nature Value (HNV) farmland in Europe, source: EEA
Mapping the capacity of ecosystems to provide provisioning and regulating services

Water quality regulation
Crop production
Soil quality regulation

Air quality regulation
Livestock production
Pollination

Low → High
The 'ecological footprint' of some EU Member States consumption (not available for all countries) plus Switzerland – an assumption and data based assessment of the natural resources consumed by a Member State, measured in hectares/capita.

Data from from National Footprint Accounts 2010 edition, WWF and Global Footprint Network, retrievable at www.footprintnetwork.org
Soil sealed surface in 2006 (source: Prokop et al., 2011).

Land take per administrative unit in the period 2000-2006 (source: Prokop et al., 2011).

Source: Corine Land Cover Data 2000-2006, Umweltbundesamt, 05/2010
Daily land take on agricultural land (source: Gardi et al., 2012).

Ca. 1000 km²/year land take in the EU
Potential wheat yield losses due to agricultural land take (1990-2006)
(source: Gardi et al., 2012)
Commodity prices

* The real price index is the nominal price index deflated by the World Bank Manufactures Unit Value Index (MUV)
EU-27 physical trade balance with the rest of the world (Source: EEA, 2010)
The Vision: By 2050 the EU has grown in a way that respects planetary boundaries, thus contributing to global economic transformation. It is competitive and provides a high standard of living with much lower environmental impacts. All resources are sustainably managed, from raw materials to energy, water, air, land and soil. Climate change targets have been met and biodiversity and the ecosystem services it provides have been protected, valued and substantially restored.
Resource productivity in the EU (index 2000 = 100)
Towards a Green Economy

- Sustainable consumption and production
- Turning waste into a resource
- Supporting research and innovation
- Environmentally harmful subsidies and getting the prices right
Some Targets

- By 2020, water abstraction stays, as a rule, below 20% of available renewable water resources.
- Maintain and enhance ecosystems and their services by establishing green infrastructure and restoring at least 15% of degraded ecosystems by 2020.
- Annual land take (i.e. the increase of artificial land) does not exceed 800 km² per year at the EU level by 2020.
- The area of land in the EU that is subject to soil erosion of more than 10 tonnes per hectare per year should be reduced by at least 25% by 2020.
- By 2020 soil organic matter levels do not decrease overall and increase for soils currently with less than 3.5% organic matter.
Fig. 3 A schematic of the soil C dynamics upon conversion from a natural to agricultural ecosystem, and subsequent adoption of recommended management practices (RMPs). In most cases, the maximum potential equals the magnitude of historic C loss. Only in some soil-specific situations, the adoption of RMPs can increase SOC pool above that of the natural system. An example of this is acid savanna soils of South America (Llanos, Cerrados) where alleviation of soil-related constraints can drastically enhance the SOC pool.
Soil erosion by water in the EU (t/ha/y).
What damage does erosion cause?

<table>
<thead>
<tr>
<th>On-site damages of water erosion</th>
<th>Off-site damages of water erosion</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Loss of organic matter</td>
<td>- Water pollution</td>
</tr>
<tr>
<td>- Soil structure degradation</td>
<td>- Water eutrophication</td>
</tr>
<tr>
<td>- Soil surface compaction</td>
<td>- Floods</td>
</tr>
<tr>
<td>- Reduction of water penetration</td>
<td>- Infrastructures burial</td>
</tr>
<tr>
<td>- Supply reduction at water table</td>
<td>- Obstruction of drainage networks</td>
</tr>
<tr>
<td>- Surface erosion</td>
<td>- Changes in watercourses shape</td>
</tr>
<tr>
<td>- Nutrient removal</td>
<td></td>
</tr>
<tr>
<td>- Increase of coarse elements</td>
<td></td>
</tr>
<tr>
<td>- Rill and gully generation</td>
<td></td>
</tr>
<tr>
<td>- Plant uprooting</td>
<td></td>
</tr>
<tr>
<td>- Reduction of soil productivity</td>
<td></td>
</tr>
</tbody>
</table>

Transport of sediment in the sea (Mediterranean) due to water erosion of soils in the hinterland
ECOSYSTEM SERVICES
FROM POLICY TO PRACTICE

- Terracing
- Ridge tillage
- Intercropping
- Subsoiling
- Contour farming
- Agroforestry
- Permanent grasslands
- Buffer strips

Review of farming practices
Soils at the interface between Atmosphere, Hydrosphere, Lithosphere and Biosphere

source: L.P. Wilding & H. Lin, 2006
A Social-Ecological system

E. Ostrom. Science 2009;325:419-422
Need for improved Collaboration – Understanding “Breaking Silos”

- Between scientific fields and within them:
  - Natural Science
    - Soil science – Plant ecology – Geology – Geography – Ecology – Agronomy etc...
  - Social Science
    - Sociology – Economy – Psychology – Philosophy – Anthropology etc...

- More active collaboration within:
  - Governmental systems
    - Agriculture – Environment – Education etc...

- And between:
  - Resource users and the governmental system
The Sustainable Development Landscape

GLOBAL OBJECTIVES

UNFCCC “Carbon”

CBD “Species”

WSFS “Calories”

+Human rights, Health, Trade, Education, Water, Desertification

LOCAL REALITIES

LAND, SOILS, WATER, BIO DIV ...
THEMES OF THE RIO+20 CONFERENCE AS DECIDED BY UNGA

- A green economy in the context of sustainable development and poverty eradication
- The institutional framework for sustainable development

The Future we want!
Thank you for your attention!